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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,105	07/13/2001	Toshiki Tachikawa	107292-00023	1324

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/904,105

Applicant(s)

TACHIKAWA ET AL.

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-10 is/are allowed.
- 6) ☒ Claim(s) 1 and 3-6 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claim 4 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in the specification filed 07/13/2001. In that paper, as shown in FIG. 8, the plurality of scan electromagnets (elements 24, 26) are disposed downstream from the deflection electromagnet 19, so this indicates that the invention is different from what is defined in the claim(s) because the claim cites "said plurality of scan electromagnets are disposed upstream from said deflection electromagnet".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3/1, 4/3/1, 5/1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pu (US 6034377) in view of Akiyama et al. (US 6218675).

Pu discloses a charged-particle beam irradiator comprising a plurality scan electromagnets (Fig. 3, elements 33, 35) to scan a charged-particle beam (FIG. 3, element 31) to expand an irradiation field, wherein kicks provided by the plurality of said scan

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electromagnets are superimposed to form a collimated irradiation field (column 4, lines 8-14 and FIG. 3: the field comes out at the exit of element 35).

Pu does not disclose wherein the plurality of scan electromagnets are provided on an entrance side of a final deflection electromagnet (**Referring to claims 1, 6**) and disposed independent of each other in X and Y directions (**Referring to claim 5/1**), wherein said plurality of scan electromagnets are interposed between said final deflection electromagnet and a deflection electromagnet disposed on an entrance thereof (**Referring to claims 3/1, 4/3/1** with assumption that the plurality of scan electromagnets are disposed on the downstream of the deflection electromagnet).

Akiyama et al. disclose a charged particle beam irradiation apparatus including plurality of scan electromagnets (FIG. 4, elements 100, 110) that are independently disposed of each other in X and Y directions and interposed between a final deflection electromagnet (FIG. 4, element 9) and a deflection electromagnet (FIG. 4, element 6) disposed on an entrance side of the final deflection electromagnet. In other words, the plurality of scan electromagnets (100, 110) are disposed on the entrance side of the final deflection electromagnet 9 and on the down stream of the deflection electromagnet 6.

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the charged particle beam irradiation apparatus disclosed by Pu by positioning the plurality scan electromagnets on the entrance side, instead of on the exit side, of the final deflection electromagnet as disclosed by Akiyama et al. The motivation of doing so is to be "possible to reduce the dose to the normal cell structure surrounding the diseased area in comparison with an

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output beam which is inclined to the design center trajectory of the beam" as taught by Akiyama et al. (column 9, lines 20-27).

Allowable Subject Matter

3. Claims 7-10 are allowed and claims 2, 3/2, and 5/2 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Referring to claims 2 and 7: The most pertinent prior art fails to disclose wherein said plurality of scan electromagnets are arranged according to following equation.

$$a_{11}(S_1) * X_1' + a_{11}(S_2) * X_2' + \dots + a_{11}(S_n) * X_n' = 0$$

where, n: number of the electromagnets.

$S_1 \dots S_n$: distance from each electromagnet to beam irradiated position

$a_{11}(S)$: coefficient of beam transport matrix

X' : beam divergence at the beam irradiated position

Therefore, the claimed invention is not disclosed by the cited prior art.

Referring to claims 3/2, 5/2, 8-10: Allowable because they depend on claim 2 or

7.

Response to Arguments

Applicant's arguments with respect to claims 1 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
May 18, 2004


HAI PHAM
PRIMARY EXAMINER